

## WHAT IS CLAIMED IS:

1. Filamentary particles of a lithium salt of a conjugated polymerizable polyacetylene having at least one terminal carboxylic acid or carboxylate group and a mixture of said polyacetylenes; said filamentary particles having a length to width ratio of at least 5:1.

2. The lithium salt filaments of claim 1 wherein the average length of said filaments between about 5 and about 50,000  $\mu\text{m}$ .

3. The lithium salt filaments of claim 1 wherein the length to width ratio is between about 5:1 and about 5,000:1.

4. The lithium salt filaments of claim 1 wherein said salt contains from 6 to 64 carbon atoms.

5. The lithium salt filaments of claim 4 wherein said salt contains from 10 to 40 carbon atoms.

6. The lithium salt filaments of claim 5 wherein said salt is the lithium salt of a polyacetylene selected from the group consisting of pentacos-10,12-diyneic acid; tricos-10,12-diyneic acid; heneicos-10,12-diyneic acid, eicos-5,7-diyneic acid and their corresponding lower alkyl esters.

7. A photosensitive coating composition suitable for image development by exposure to a source of radiation which comprises an inert matrix containing an effective imageable amount of the lithium salt filaments of claim 1 wherein the filamentary particles have a length to width ratio of greater than 5:1 and the average length of the filaments is between about 10 and about 50  $\mu\text{m}$ .

8. The composition of claim 7 wherein said matrix is water or a solution or dispersion of a natural or synthetic polymer or a mixture thereof.

9. The composition of claim 8 wherein the matrix is an aqueous solution of gelatin.

10. The composition of claim 7 wherein said salt is the lithium salt of a polyacetylene selected from the group consisting of pentacos-10,12-dienoic acid; tricos-10,12-dienoic acid; heneicos-10,12-dienoic acid; eicos-5,7-dienoic acid and their corresponding lower alkyl esters and mixtures thereof.

11. The lithium salt of claim 6 wherein said salt is the lithium salt of pentacos-10,12-dienoic acid.

12. The composition of claim 10 wherein said salt is the lithium salt of pentacos-10,12-dienoic acid.

13. A substrate carrying the composition of claim 7.

14. A substrate carrying the dry composition of claim 7.

15. A dosimeter comprising a substrate of claim 14.

16. A radiation indicator comprising a substrate of claim 14.

17. The process for preparing the lithium salt filaments of claim 1 which comprises the following steps in sequence:

- (a) mixing a solution of a conjugated, polymerizable polyacetylene having at least one terminal carboxylic acid or carboxylate functional group in a matrix which is inert to said polyacetylene and any polymerized product thereof;
- (b) contacting the carboxylic acid and/or carboxylate terminal group of the polyacetylene with a lithium salt sensitizer reactive with said carboxylic acid and/or carboxylate group to form a solution of the lithium salt of said polyacetylene;
- (c) quenching the resulting matrix/lithium salt solution of (b) to below room temperature and holding at that temperature for a period sufficient to nucleate and precipitate the lithium/polyacetylene salt in the matrix;
- (d) optionally heating and holding the product of step (c) until the filaments of the lithium/polyacetylene salt form and grow to an average length greater than 5  $\mu\text{m}$  and a length to width ratio of at least 5:1;
- (e) optionally reducing the length of the filaments by mechanical means;
- (f) optionally repeating steps (d) through (e) until a desired filament length and radiation sensitivity is obtained and
- (g) recovering the filamentary salt product of claim 1 as the product of the process.

18. The process of claim 17 wherein the lithium salt sensitizer is selected from the group consisting of a lithium halide, lithium nitrate; lithium sulfate; lithium carbonate; a lithium alkyl carboxylate; a lithium aryl carboxylate and a mixture thereof.

19. The process of claim 17 wherein step (d) is carried out at a temperature of between about 40° and about 100°C.

20. The process of claim 17 wherein said matrix is selected from the group consisting of gelatin, collagen, agar, xanthan gum, synthetic polymer and mixtures thereof.

21. The process of claim 17 wherein said matrix is an aqueous solution of gelatin.

22. The process of claim 17 wherein said matrix is water.

23. The process of claim 17 wherein the weight ratio of lithium/polyacetylene salt to matrix in step (b) is between about 100:1 and 1:10.

24. The filamentary salt of claim 1 dispersed in an inert matrix suitable for coating a substrate wherein the weight ratio of said salt to matrix is between about 4:1 and about 1:5.

25. The filamentary salt of claim 24 dispersed in a film-forming matrix selected from the group consisting of gelatin, collagen, agar, xanthan gum, a synthetic film forming polymer and a mixture thereof.

26. The filamentary salt of claim 1 dispersed in dry gelatin.

27. The process which comprises contacting a dispersion of platelets of a lithium salt of a conjugated polyacetylene with at least 0.1 wt.% of the filaments of claim 1 for a period sufficient to convert said platelets to filaments.

28. The process wherein the filamentary salt product of the process of claim 17 is contacted with a lithium/acetylene salt composed of plate-like particles and held at an elevated temperature for a period sufficient to convert the plate-like particles to filamentary particles.

29. The process wherein the filamentary salt product of claim 17 is mixed with a solution of a polymerizable, conjugated polyacetylene having at least one terminal carboxylic acid or carboxylate group or a mixture thereof and contacted with a solution of a lithium salt sensitizer selected from the group consisting of a lithium halide, lithium nitrate, lithium sulfate, lithium carbonate, a lithium alkyl carboxylate, a lithium aryl carboxylate and mixtures thereof.